API 682 – Plan 53B

Enjoy the Flopac performance and treat your equipment by selecting the Flopac® series SPB-5__ seal support systems.

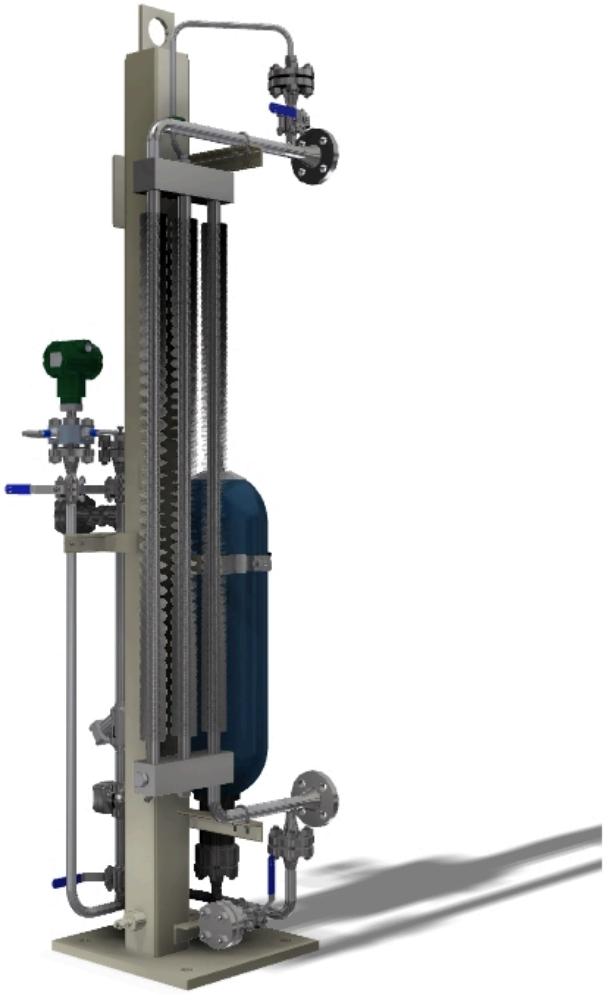
The range of Flopac® SPB seal support systems include plan 53B seal flushing units that are typically used with arrangement 3 contacting wet seals (3CW-FB, 3CW-BB, 3CW-FF).

Plan 53B seal support systems are closed loop piping systems that circulate barrier liquid between a pressurised dual seal arrangement – to cool and lubricate the in- and outboard seals. The closed loop is provided with a gas-loaded bladder type accumulator to maintain the barrier liquid a higher pressure than the process pressure in the seal chamber. This offers the highest level of safety eliminating process leakage entirely.

Flopac seal support systems; for reliable seal performance and optimal process efficiency.

Advantages:

- **Compact and light weight designs.**
- **Engineered to offer an optimal user experience.**
- **Complete (API 682) compliant packages.**
- **Quick delivery program for our competitively priced standard range.**
- **Custom designs available.**



Technical Specification API 682 – Plan 53B

The range of Flopac® SPB seal support systems include plan 53B seal flushing units that are typically used with arrangement 3 contacting wet seals (3CW-FB, 3CW-BB, 3CW-FF).

Plan 53B – Description

Purpose

Plan 53B seal support systems provide a barrier fluid to cool and lubricate the in- and outboard seals. The barrier fluid is maintained at a pressure greater than the seal box to eliminate product leakage.

Operation

Plan 53B seal support systems are closed loop systems that provide a pressurised barrier fluid for the inner and outer seal of a pressurized dual seal arrangement. During normal operation, liquid circulation between the closed loop and seal is maintained by an internal pumping ring. The barrier fluid is pressurised by an external gas-loaded bladder type accumulator.

A bladder type accumulator is a standardised reservoir that contains a bladder within. The bladder is charged with an inert gas – usually nitrogen – to a predetermined pressure. Introducing a barrier fluid in excess of that pressure will compress the gas loaded bladder storing barrier liquid at a pressure greater than the process/seal chamber pressure. The greater pressure will reverse the normal leakage where the barrier fluid will leak into the process instead. Thus the product leakage is eliminated entirely.

Maintenance is limited to a timely refill of barrier fluid. Refer to notes/recommendations below.

Heat exchangers

In order to provide cool barrier fluid plan 53B seal support systems are often equipped with a cooler. The cooling capacity must be designed to cope with the seals heat generation and the heat soak. Natural air draught cooling is the preferred method for cooling.

Plan 53B seal support systems are ideally suited to fit natural air draught cooling designs, but our flexible designs will allow for external water coolers or forced air blast coolers just as easy. Flopac can provide all. Please have a look at our cooler section to check our standard availability. Tailored solutions are also available.

Instrumentation

A plan 53B should be equipped with a pressure indicating transmitter to monitor the systems pressure and – applying Boyle's law – the liquid volume. This will omit the need for a level transmitter and a level gauge bringing considerable savings. A temperature instrument could be considered if relevant.

Notes/recommendations

Flopac provides a complete API 682 compliant package, including all the necessary appendages.

The operating principle of this seal plan accepts a certain leakage of barrier fluid into the process.

Though little (typically 10cc/h and less), the compatibility of the barrier fluid with product must be verified.

The unit operates under pressurised conditions. A safe refill of barrier fluid – under pressurised conditions – requires specific equipment, usually referred to as topping-up / make up or refill units. Please refer to our section Make up units for further details.

For most pressurised applications we would recommend a plan 53B rather than plan 53A or 53C. Easy to operate plan 53B systems need little maintenance and perform highly reliable, while our flexible designs are easily adopted to cope with the most challenging needs. Best suited for natural air draught cooler designs. A Plan 53B would not need a process tap, like the 53C, and, containing the pressurising gas apart from the barrier liquid it eliminates the worry of the gas dissolving in the barrier fluid, like with the 53A.

Independent of the often limited pressure capacities of a plant gas network the 53B can be operated at any desired pressure level.

Please contact Flopac for a more detailed advise on all topics related to Flopac® seal support system plan 53B. We will gladly assist.

Plan 53B – main features

- **Pressurised by a gas loaded accumulator.**
- **No product leakage.**
- **Lubricates and cools the seals.**
- **Clean barrier fluid film on inboard seal faces improves seal live.**
- **Circulation device needed.**

Benefits of the Flopac Plan 21

- Wetted parts all SS316.
- Flexible designs all properly engineered.
- Reliable performance.
- API 682/ISO 21049 compliant
- Compact and lightweight configuration.
- Directly from the manufacturer.

Options

- Alternative material selections for specific services like HF and H_2S (NACE) services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.

- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a barrier liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels should not be used!)

Mechanical seal system SPB-500

A complete and fully functional Plan 53B system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters ≤ 60mm and >60mm.

These low budget, yet complete and fully functional API 682 compliant units are best suited for standard applications. Appreciating the need for sustainable and robust designs, without compromising performance, system construction primarily uses SS316 tubing and tubing components, except for the accumulator and cooling section.

For the tube fittings Flopac uses double ferrule compression fittings, make Swagelok. These fittings are absolutely leak- and gas-tight, resistant to high pressures and temperatures and are known for their reliability.

The accumulator is a commodity item that is usually constructed from Cr/Mo steel using a Nitrile bladder and seals. Other materials available on request.

The highly efficient Flopac forced- or natural air draught seal coolers are constructed from SS316L seamless piping with full contact laser-welded SS316Ti cooling fins. Our range of TEMA C shell & tube seal coolers typically use SS316L piping with a SS316 bundle and CS shell.

Other materials available on request.

Standard configuration

Design PED 2014/68/EU (CE) – ATEX 2014/34/EU for a Zone 2 II/A T1-T3.
and/or ASME VIII – div. 1 w/o U-stamp.

Suitable for general oil/water service – Non-hazardous, wetted parts AISI 316(L).

Design 40 barg @ -15/+90°C / ANSI 300#-sch.40s.

Seal supply and return connections ¾" NPT
Fill connection 1/2" NPT c/w quick connector
Remainder 1/2" NPT.

Engineering units: SI units, Bar/°C.
NDE: Visual-/hydrostatic and leaktesting
Surface preparation: Flopac standard

Including a SS316L/316Ti heat exchanger, Flopac type CNA-100 with a nominal capacity of 750 Watt.
Coolers with higher capacities available at request.

Including one 4-20mA Smart/Hart® pressure indicating transmitter, installed complete with a SS316 instrument block/bleed valve.

Available at request:
Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
Refer to the section 'options' below.

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- Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
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SPB-500 Configuration

Main components

One piping assembly

An all stainless steel 316/316L construction with threaded NPT connections, as appropriate.

Appendages

The fill-, vent- and drain connections are provided with a valve. The fill connection is additionally fitted with a butt-welded non-return valve to prevent the accidental backflow of potentially hot and dangerous barrier liquid during filling operations. The nitrogen charge connection is a commodity item provided with a gas-valve. Further appendages as appropriate.

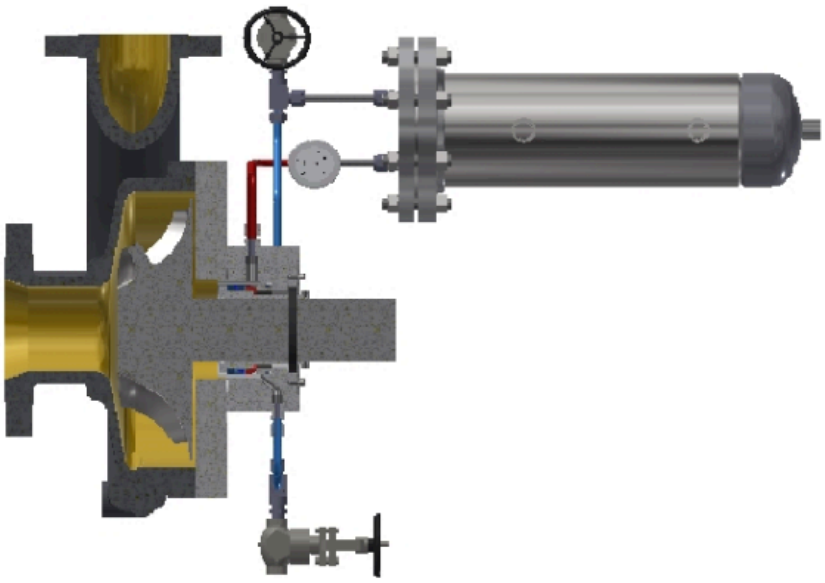
One pressure indicating transmitter

A 4-20mA Smart/Hart® pressure transmitter of high industrial quality with a 0.2% accuracy and including a local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a SS316 instrument block and bleed valve.

One natural air draught cooling secion

A Flopac high efficiency CNA-100 natural air draught cooler, body material SS316L with full contact laser-welded 316Ti cooling fins(*1). Nominal capacity 750 Watt. Higher capacities available on request.

*(*1) The full contact laser-welded 316Ti fins offer superior strength and a much better heat conductivity. 316Ti fins are well suited for offshore conditions.*



Options

- Alternative material selections for specific services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.
- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a barrier liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels cannot be used!)

Mechanical seal system SPB-580

A complete and fully functional Plan 53B system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters ≤ 60mm and >60mm.

These low budget, yet complete and fully functional API 682 compliant units are best suited for standard applications. Appreciating the need for sustainable and robust designs, without compromising performance, system construction primarily uses SS316L piping and piping components, except for the accumulator.

Materials and fabricated joints in line with table 4 of the API 682.

The accumulator is a commodity item that is usually constructed from Cr/Mo steel using a Nitrile bladder and seals. Other materials available on request.

The highly efficient Flopac forced- or natural air draught seal coolers are constructed from SS316L seamless piping with full contact laser-welded SS316Ti cooling fins. Our range of TEMA C shell & tube seal coolers typically use SS316L piping with a SS316 bundle and CS shell.

Other materials available on request.

Standard configuration

Design PED 2014/68/EU (CE) – ATEX 2014/34/EU for a Zone 2 II/A T1-T3. and/or ASME VIII – div. 1 w/o U-stamp.

Suitable for general oil/water service – Non-hazardous, wetted parts AISI 316(L).

Design 40 barg @ -15/+90°C / ANSI 300#-sch.40s.

Seal supply and return connections ANSI ¾"–300#
Remainder 1/2" NPT.

Engineering units: SI units, Bar/°C.
NDE: Visual-/hydrostatic and leaktesting
Surface preparation: Flopac standard

Including a SS316L/316Ti heat exchanger, Flopac type CNA-100 with a nominal capacity of 750 Watt. Coolers with higher capacities available at request.

Including one 4-20mA Smart/Hart® pressure indicating transmitter, installed complete with a SS316 instrument block/bleed valve.

Available at request:

- Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
- Refer to the section ‘options’ below.

SPB-500 Configuration

Main components

One piping assembly

An all stainless steel 316/316L threaded or socket-welded piping construction with flanged seal supply and return connections. The remainder of client connections are threaded NPT. Flanged termination points for all client connections are available on request.

Appendages

The fill-, vent- and drain connections are provided with a valve. The fill connection is additionally fitted with a non-return valve to prevent the accidental backflow of potentially hot and dangerous barrier liquid during filling operations. The nitrogen charge connection is a commodity item provided with a gas-valve. Further appendages as appropriate;

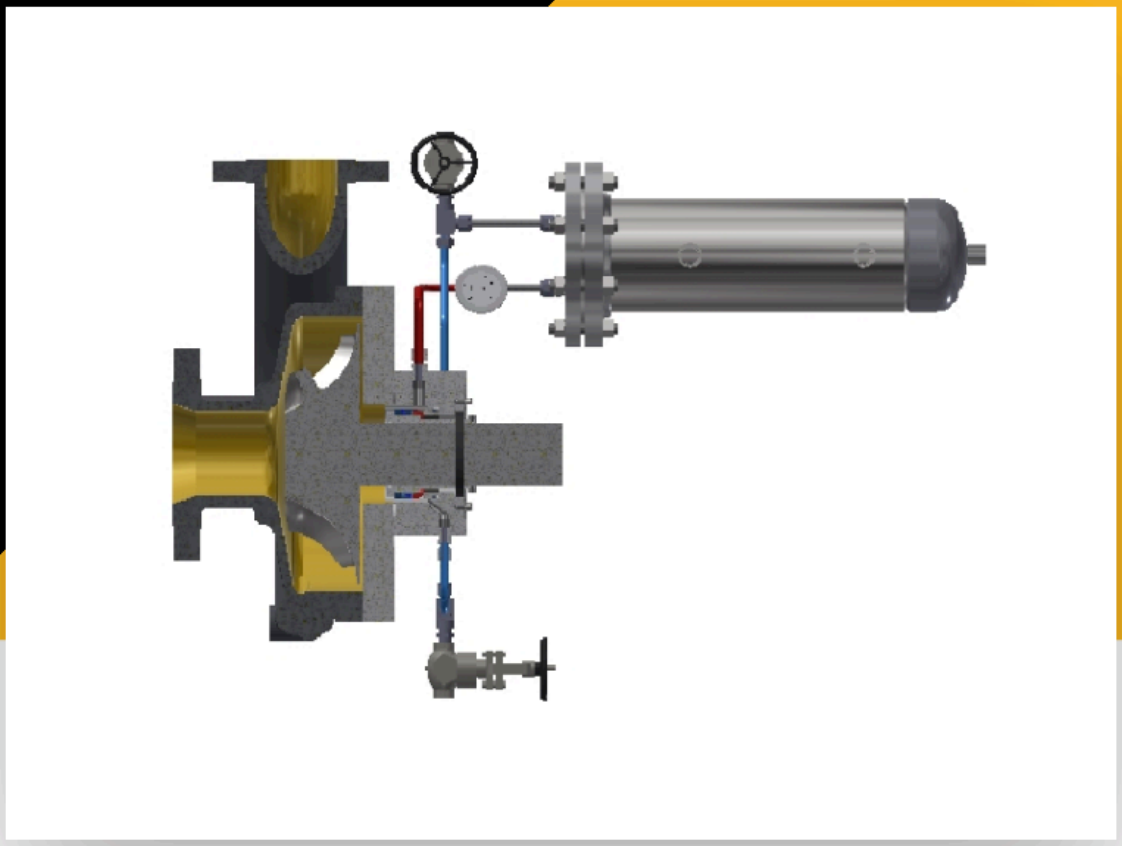
One pressure indicating transmitter

A 4-20mA Smart/Hart® pressure transmitter of high industrial quality with a 0.2% accuracy and including a local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a SS316 instrument block and bleed valve.

One natural air draught cooling secion

A Flopac high efficiency CNA-100 natural air draught cooler, body material SS316L with full contact laser-welded 316Ti cooling fins(*1). Nominal capacity 750 Watt. Higher capacities available on request.

*(*1) The full contact laser-welded 316Ti fins offer superior strength and a much better heat conductivity. 316Ti fins are well suited for offshore conditions.*



Options

- Alternative material selections for specific services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.
- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a barrier liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels cannot be used!)

Mechanical seal system SPB-590

A complete and fully functional Plan 53B system for arrangement 3 (3CW-FB, 3CW-BB, 3CW-FF) dual seals in accordance with API 682 or ISO 21049 latest edition – for shaft diameters ≤ 60mm and >60mm.

These high-end all butt-welded API 682 compliant units are best suited for the non-standard critical, hazardous and/or highly corrosive applications. Appreciating the need for sustainable and robust designs, without compromising performance, system construction primarily uses SS316L butt-welded piping and butt-welded piping components, except for the accumulator.

Compared to threaded or socket-welded piping constructions the butt-welded piping construction offers a superior quality in strength and corrosion resistance.

The accumulator is a commodity item that is usually constructed from Cr/Mo steel using a Nitrile bladder and seals. Other materials available on request.

The highly efficient Flopac forced- or natural air draught seal coolers are constructed from SS316L seamless piping with full contact laser-welded SS316Ti cooling fins. Our range of TEMA C shell & tube seal coolers typically use SS316L piping with a SS316 bundle and CS shell.

Other materials available on request.

Standard configuration

Design PED 2014/68/EU (CE) – ATEX 2014/34/EU for a Zone 2 II/A T1-T3.
and/or ASME VIII – div. 1 w/o U-stamp.

Suitable for general oil/water service – Non-hazardous, wetted parts AISI 316(L).

Design 40 barg @ -15/+90°C / ANSI 300#-sch.40s.

Seal supply and return connections ANSI WN RF ¾"–300#
Remainder ANSI WN RF 1/2"-300#.

Engineering units: SI units, Bar/°C.
NDE: Visual-/hydrostatic and leaktesting
Surface preparation: Flopac standard

Including a SS316L/316Ti heat exchanger, Flopac type CNA-100 with a nominal capacity of 750 Watt.
Coolers with higher capacities available at request.

Including one 4-20mA Smart/Hart® pressure indicating transmitter, installed complete with a SS316 instrument block/bleed valve.

Available at request:

- Extended NDE packages to include inspections such as X-ray, LPE and P(A)MI.
- Refer to the section 'options' below.

SPA-590 Configuration

Main components

One piping assembly

An all stainless steel 316/316L butt-welded piping construction with ANSI RF 300# Welding Neck flanges for all client connections.

Appendages

The fill-, vent- and drain connections are provided with a butt-welded valve. The fill connection is additionally fitted with a butt-welded non-return valve to prevent the accidental backflow of potentially hot and dangerous barrier liquid during filling operations. The nitrogen charge connection is a commodity item provided with a gas-valve. Further appendages as appropriate.

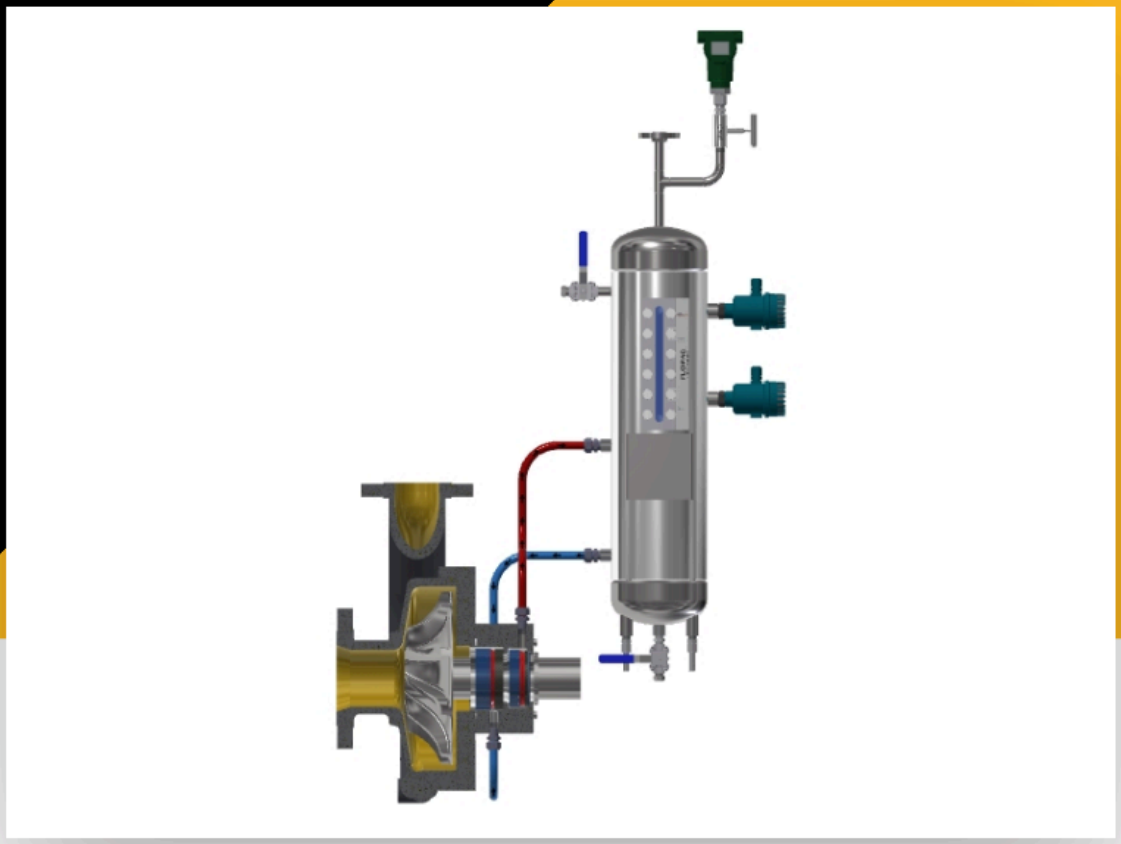
One pressure indicating transmitter

A 4-20mA Smart/Hart® pressure transmitter of high industrial quality with a 0.2% accuracy and including a local display. Wetted parts SS316 with an IP 66 PU coated aluminium housing. Mounted on a (butt-welded) SS316 instrument block and bleed valve.

One natural air draught cooling section

A Flopac high efficiency CNA-100 natural air draught cooler, body material SS316L with full contact laser-welded 316Ti cooling fins(*1). Nominal capacity 750 Watt. Higher capacities available on request.

*(*1) The full contact laser-welded 316Ti fins offer superior strength and a much better heat conductivity. 316Ti fins are well suited for offshore conditions.*



Options

- Alternative material selections for specific services.
- Flexible designs to fit a specific location or available space.
- High pressure designs (ANSI 600# / 1500#) for static designs up to 200 barg.
- Additional temperature- or flow instruments to enhance monitoring facilities.
- Addition of a buffer liquid circulation unit; to ensure circulation and to enhance cooling capacity.
- Addition of an all stainless steel 5 ltr refill unit with 75cc/str handpump. (Other refill options available. Note: filling funnels should not be used!)

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